



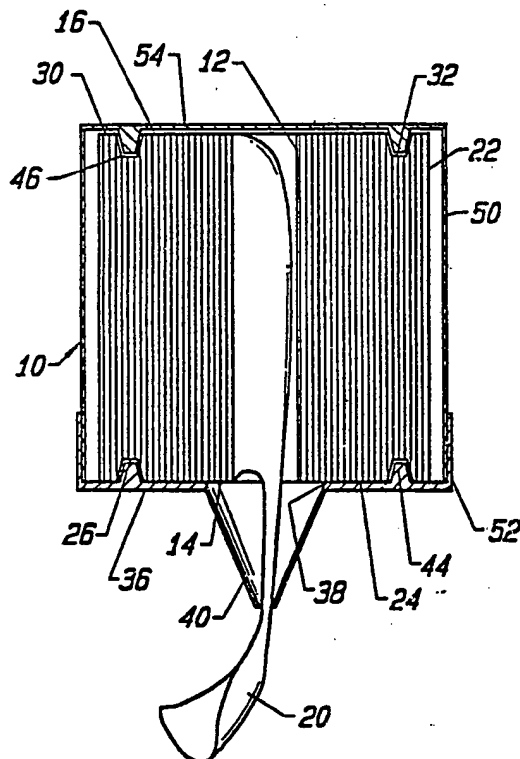
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : <b>A47K 10/38</b>	<b>A1</b>	(11) International Publication Number: <b>WO 93/22964</b> (43) International Publication Date: 25 November 1993 (25.11.93)
<p>(21) International Application Number: PCT/US93/04744</p> <p>(22) International Filing Date: 18 May 1993 (18.05.93)</p> <p>(30) Priority data: 886,592 21 May 1992 (21.05.92) US</p> <p>(71) Applicant: JAMES RIVER CORPORATION OF VIRGINIA [US/US]; 120 Tredegar Street, Richmond, VA 23219 (US).</p> <p>(72) Inventor: MOODY, John, R. ; 2900 Sunflower Drive, Antioch, CA 94509 (US).</p> <p>(74) Agent: MELLER, Michael, N.; Meller and Associates, P.O. Box 2198, Grand Central Station, New York, NY 10163 (US).</p>		<p>(81) Designated States: European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report. With amended claims.</p>

(54) Title: DISPENSER WITH STABILIZER FOR CORELESS ROLL PRODUCTS

## (57) Abstract

A center-pull dispenser housing (10) has a top (54) and a support (36), the support defining a dispensing aperture (38). A coreless roll (12) of sheet material is disposed on the support (36) with the lead end of the sheet material (20) extending from the coreless roll center through the dispensing aperture (38). The coreless roll (12) has either channels (26, 32) or projections (28A) formed at the ends thereof which cooperate with stabilizing elements (44, 58) on the housing to resist movement of the coreless roll (12) and collapse of the coreless roll (12) as it nears depletion.



BEST AVAILABLE COPY

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NL	Netherlands
BE	Belgium	GN	Guinea	NO	Norway
BF	Burkina Faso	GR	Greece	NZ	New Zealand
BG	Bulgaria	HU	Hungary	PL	Poland
BJ	Benin	IE	Ireland	PT	Portugal
BR	Brazil	IT	Italy	RO	Romania
CA	Canada	JP	Japan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SK	Slovak Republic
CI	Côte d'Ivoire	LJ	Liechtenstein	SN	Senegal
CM	Cameroon	LK	Sri Lanka	SU	Soviet Union
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	MC	Monaco	TG	Togo
DE	Germany	MG	Madagascar	UA	Ukraine
DK	Denmark	ML	Mali	US	United States of America
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

-1-

DISPENSER WITH STABILIZER FOR CORELESS ROLL PRODUCTSTECHNICAL FIELD

This invention relates to a dispenser system for dispensing sheet material from a coreless roll. The invention has particular application to the dispensing of paper toweling and the like from a "center-pull" dispenser. The roll is stabilized during dispensing and collapse of the coreless roll is resisted as it nears depletion.

BACKGROUND ART

It is well known in the prior art to dispense paper toweling, tissue, and similar products from the center of a coreless roll thereof. For example, U.S. Patent No. 4,905,868, issued March 6, 1990, discloses a paper towel dispenser of the "center-pull" type wherein paper toweling is dispensed from the center of a coreless roll by pulling same through a dispenser nozzle of a specific character.

Several problems arise when attempting to dispense from free standing coreless rolls of paper toweling or the like. For example, coreless rolls of paper toweling have a tendency to collapse as they near depletion due to dispensing. This can interfere with proper dispensing of the remaining material. In addition, it is necessary, or at least desirable, to maintain the roll in a fixed position relative to the dispensing opening of the dispenser to ensure proper operation. If a roll is dislodged from such position, as for example by a too vigorous pull being exerted on the sheet material being dispensed, proper operation can also be interfered with.

The prior art discloses a number of arrangements for supporting and stabilizing rolls of paper toweling and

-2-

the like within dispenser cabinets. Believed representative of such arrangements are the systems shown in U.S. Patent No. 5,028,097, issued July 2, 1991, U.S. Patent No. 4,974,783, issued December 4, 1990, U.S. Patent No. 3,089,659, issued May 14, 1963, U.S. Patent No. 3,038,598, issued June 13, 1962, and U.S. Patent No. 4,013,240, issued March 22, 1977. The arrangements disclosed in the patents just noted all are specifically adapted for use when dispensing paper toweling and the like from rolls having cores and which deliver sheet material from the outer peripheries of the rolls during rotation within the dispensing cabinet. Such arrangements are inapplicable to the dispensing of sheet material from the center of a coreless roll which remains stationary within a dispenser and is positioned on end.

When practicing the teachings of the present invention the coreless roll includes channels and/or projections at the coreless roll ends which cooperate in a specific manner with stabilizing means to accomplish the desired results of maintaining the coreless roll in a predetermined position and for resisting collapse of the coreless roll when it nears depletion. U.S. patents are in existence which disclose rolls of toweling and the like which incorporate a core and have grooves and/or bosses as well as equipment and methods for forming same. There is no teaching, however, of employing such expedients on a coreless roll and it will be appreciated that quite different considerations are involved when dispensing from the center of stationary coreless rolls as compared to rotatable rolls employing center cores. Applicant is aware of the following U.S. patents relating to rolls with cores and having grooves and/or bosses, as well as systems for manufacturing same: 3,282,525, issued November 1, 1966, 4,951,891, issued August 28, 1990, and 4,431,141, issued February 14, 1984.

DISCLOSURE OF INVENTION

The present invention relates to a system for inexpensively, efficiently, and effectively maintaining a coreless roll of sheet material in a predetermined position relative to a dispensing aperture and for resisting collapse of the coreless roll when the coreless roll nears depletion caused by dispensing of the sheet material through the dispensing aperture.

The dispenser apparatus of the present invention is for dispensing sheet material from the center of a coreless roll of the sheet material having a first end and an opposed second end.

The dispenser apparatus includes housing means defining an interior and including a support engageable by the coreless roll first end to support the coreless roll of sheet material. The support defines a dispensing aperture through which sheet material from the coreless roll is pulled when dispensing the sheet material from the center of the roll.

Stabilizing means is provided for maintaining the coreless roll in a predetermined position relative to the dispensing aperture when the coreless roll is supported by the support means. In addition, the stabilizing means is for resisting collapse of the coreless roll when the coreless roll nears depletion caused by dispensing of the sheet material through the dispensing aperture.

At least the coreless roll first end has a planar portion formed by edges of a first plurality of convolutions of sheet material and an offset portion defined by edges of a second plurality of sheet material convolutions offset from the edges of the first plurality of convolutions. The stabilizing means includes at least one stabilizing element at least partially registrable with the offset portion and

-4-

cooperable therewith to resist movement of the coreless roll relative to the dispensing aperture.

According to one embodiment of the invention, the stabilizing element comprises a rib projecting upwardly from the support and the coreless roll offset portion comprises a channel, the rib being received in the channel when the support engages the coreless roll first end and supports the coreless roll.

In another embodiment constructed in accordance with the teachings of the present invention, the stabilizing element comprises a recess formed in the support, the coreless roll offset portion comprising a projecting extending outwardly from the coreless roll planar portion and received within the recess when the support engages the coreless roll first end and supports the coreless roll.

Other features, advantages, and objects of the present invention will become apparent with reference to the following description and accompanying drawings.

#### BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a cross-sectional, elevational view of dispenser apparatus constructed in accordance with the teachings of the present invention accommodating therein a coreless roll constructed in accordance with the teachings of the present invention;

Fig. 2 is a top, plan view of the dispenser apparatus of Fig. 1; and

Fig. 3 is a view similar to Fig. 1, but illustrating an alternative form of dispenser apparatus in combination with an alternative form of coreless roll.

#### MODES FOR CARRYING OUT THE INVENTION

Referring now to Figs. 1 and 2, dispenser apparatus

constructed in accordance with the teachings of the present invention is illustrated. The dispenser apparatus includes a housing 10 defining an interior accommodating a coreless roll 12 of sheet material. For purposes of illustration, the sheet material is paper toweling; however, it is to be understood that the teachings of the present invention are applicable to other types of sheet material, such as paper tissue.

Coreless roll 12 has a first end 14 and an opposed second end 16. The roll has a lead end 20 which projects from the center of the coreless roll and a tail end 22 comprising all or a portion of the outer convolution of the roll.

First end 14 of the coreless roll has a planar portion 24 formed by edges of a first plurality of convolutions of the toweling and an offset portion 26 defined by edges of a second plurality of sheet material convolutions offset from the edges of the first plurality of convolutions. Offset portion 26 is in the form of a circular-shaped channel surrounding the center of the roll and located closely adjacent to the outer periphery thereof.

Coreless roll second end 16 also has a planar portion formed by edges of a first plurality of convolutions and an offset portion 32 defined by edges of a second plurality of sheet material convolutions offset from the edges of the first plurality of convolutions. The offset portion 32 is in the form of a circular-shaped channel surrounding the center of the coreless roll and located closely adjacent to the outer periphery of the coreless roll. In the arrangement illustrated, offset portions 26, 32 are in alignment. While this is a preferred approach, such relationship is not necessary in order to practice the teachings of the present invention.

The offset portions or channels 26, 32 may be formed in any desired manner. For example, the offset portions 32 may be formed by cutting them with a suitable cutter blade or tool after the roll has been formed or by utilizing a slitter-groover technique during formation of the roll such as that taught by U.S. Patent No. 4,951,891, referenced above.

In the arrangement of Figs. 1 and 2, the housing includes a support 36 which is a bottom wall having a circular configuration. The support defines a dispensing aperture 38 through which toweling from the coreless roll 12 is pulled when dispensing the toweling from the center of the roll. In the arrangement shown, dispensing aperture 38 leads to the passageway of a cone-like element 40 which defines a restricted opening at the distal end thereof through which the toweling is pulled. The element 40 exerts a frictional restraining force on the toweling, enabling the user to sever individual towels of the toweling along perforated lines formed in the toweling, in the well known manner. Of course, roll 12 need not be perforated in order to practice the teachings of the present invention.

A circular rib 44 projects upwardly from support 36 and such rib conforms substantially to the shape of the offset portion 26 and location thereof. Likewise, a rib 46 projects downwardly from the top of the housing and enters offset portion 32.

Ribs 44, 46 are stabilizing elements which maintain coreless roll 12 in a predetermined fixed position relative to the dispensing aperture 38 when the coreless roll is supported by support 36. The ribs also cooperate with the roll to resist collapse of the roll when it nears completion caused by dispensing of the sheet material through the dispensing aperture. Such collapse would normally occur when dispensing of the toweling leaves only a relatively few convolutions



-7-

adjacent to the outer periphery of the roll.

Housing 10 includes two separable housing components 50, 52 which may readily be separated or assembled, as desired, so that a new coreless roll may be positioned in the housing interior upon depletion of its predecessor roll. Housing component 50 includes the top or upper wall 54 from which rib 46 projects and housing component 52 includes support 36 as well as a flange 56 for receiving the side wall of housing component 50.

The dispensing apparatus and associated coreless roll shown in Fig. 3 differ somewhat from those structural elements illustrated in Figs. 1 and 2. More particularly, in the Fig. 3 embodiment, the coreless roll 12A has an offset portion in the form of a channel only at one end (the upper end) of the roll. The offset portion 26A of roll 12A is in the form of a circular projection surrounding the center of the roll and located closely adjacent to the outer periphery of coreless roll 12A.

The support 36A of the housing defines a circular recess 58. Projection or offset portion 26A extending outwardly from the coreless roll planar portion is received within recess 58 when the support 36A engages the coreless roll first end and supports the coreless roll. Thus, as was the case with respect to the first embodiment of Figs. 1 and 2, this embodiment of the invention provides stability for the coreless roll at both the upper and lower ends thereof.

Other variations are possible. For example, the roll offset portions may both comprise projections and the stabilizing elements may comprise recesses in both the housing top and housing support.

CLAIMS

1. Dispenser apparatus for dispensing sheet material from the center of a coreless roll of said sheet material having a first end and an opposed second end, said dispenser apparatus comprising, in combination:

housing means defining an interior and including a support engageable by the coreless roll first end to support said coreless roll of sheet material, said support defining a dispensing aperture through which sheet material from the coreless roll is pulled when dispensing said sheet material from the center of said roll; and

stabilizing means for maintaining said coreless roll in a predetermined position relative to said dispensing aperture when said coreless roll is supported by said support means and for resisting collapse of said coreless roll when said coreless roll nears depletion caused by dispensing of said sheet material through said dispensing aperture.

2. The apparatus according to Claim 1 wherein at least said coreless roll first end has a planar portion formed by edges of a first plurality of convolutions of sheet material and an offset portion defined by edges of a second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions, said stabilizing means including at least one stabilizing element at least partially registrable with said offset portion and cooperable therewith to resist movement of said coreless roll relative to said dispensing aperture.

3. The apparatus according to Claim 2 wherein said stabilizing element comprises a rib projecting upwardly from said support, said coreless roll offset portion

comprising a channel, said rib being received in said channel when said support engages the coreless roll first end and supports said coreless roll.

4. The apparatus according to Claim 2 wherein said stabilizing element comprises a recess formed in said support, said coreless roll offset portion comprising a projection extending outwardly from said coreless roll planar portion and received within said recess when said support engages the coreless roll first end and supports said coreless roll.

5. The apparatus according to Claim 2 wherein said coreless roll second end also has a planar portion formed by edges of said first plurality of convolutions and an offset portion defined by edges of said second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions, said stabilizing means including at least one stabilizing element at least partially registrable with the offset portion of said second end and cooperable therewith to resist movement of said coreless roll relative to said dispensing aperture.

6. The apparatus according to Claim 5 wherein said housing includes an upper wall, said stabilizing element at least partially registrable with the offset portion of said second end and cooperable therewith to resist movement of said cordless roll relative to said dispensing aperture being located at said upper wall.

7. The apparatus according to Claim 6 wherein said stabilizing elements are in general alignment, said stabilizing elements being out of registration with said dispensing aperture and located closely adjacent to the outer periphery of said coreless roll.

-10-

8. The apparatus according to Claim 7 wherein said stabilizing elements have a generally circular configuration.

9. The apparatus according to Claim 6 wherein said housing includes two separable housing components, one of said housing components including said support and the other of said housing components including said upper wall, said support and said upper wall being separated a distance generally corresponding to the length of said coreless roll when assembled to form said housing.

10. In combination:

a center-pull dispenser housing having a top and a support, said support defining a dispensing aperture spaced from said top;

a coreless roll of sheet material disposed on end on said support with the coreless center of said roll in at least partial registration with said dispensing aperture, the lead end of the sheet material of said coreless roll extending from said coreless roll center through said dispensing aperture; and

stabilizing means in operative association with said housing and said coreless roll for maintaining said coreless roll in a predetermined position relative to said dispensing aperture and for resisting collapse of said coreless roll when said coreless roll nears depletion due to dispensing of said sheet material through said dispensing aperture.

11. The combination according to Claim 10 wherein the opposed ends of said coreless roll each include a planar portion formed by edges of a first plurality of

-11-

convolutions of sheet material and an offset portion defined by edges of a second plurality of sheet material convolutions, said stabilizing means comprising stabilizing elements extending from said housing top and support engageable with said offset portions.

12. A coreless roll of sheet material for dispensing from dispenser apparatus including a housing having a top and a support spaced a predetermined distance from said top, said support defining a dispensing aperture, said coreless roll having a first end, a second end, and said sheet material including a lead end projectable from the center of said coreless roll through said dispensing aperture when said coreless roll is positioned on said support with the coreless roll first end in engagement with said support, said coreless roll first and second ends each having a planar portion formed by edges of a first plurality of sheet material convolutions and an offset portion defined by edges of a second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions, said first and second end offset portions being located closely adjacent to the outer periphery of said coreless roll and spaced from the center of said coreless roll, said offset portions being cooperable with stabilizer elements at said top and at said support when said coreless roll is positioned on said support with the coreless roll first end in engagement with said support to maintain said coreless roll in a predetermined position relative to said dispensing aperture and resist collapse of said coreless roll when said coreless roll nears depletion caused by dispensing of said sheet material through said dispensing aperture.

13. The coreless roll of Claim 12 wherein said offset portions are in alignment.

## AMENDED CLAIMS

[received by the International Bureau on 8 October 1993 (08.10.93) ;  
original claims 1-13 replaced by  
amended claims 1-11 (4 pages)]

1. Dispenser apparatus for dispensing sheet material from the center of a coreless roll of said sheet material having a first end and an opposed second end, said dispenser apparatus comprising, in combination:

housing means defining an interior and including a support engageable by the coreless roll first end to support said coreless roll of sheet material, said support defining a dispensing aperture through which sheet material from the coreless roll is pulled when dispensing said sheet material from the center of said roll; and

stabilizing means for maintaining said coreless roll in a predetermined position relative to said dispensing aperture when said coreless roll is supported by said support means and for resisting collapse of said coreless roll when said coreless roll nears depletion caused by dispensing of said sheet material through said dispensing aperture and wherein said first end of said coreless roll has a planar portion formed by edges of a first plurality of convolutions of sheet material and an offset portion defined by edges of a second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions and wherein said stabilizing means includes at least one stabilizing element at least partially registrable with said offset portion and cooperable therewith to resist movement of said coreless roll relative to said dispensing aperture.

2. The apparatus according to Claim 1 wherein said stabilizing element comprises a rib projecting upwardly from said support, said coreless roll offset portion

comprising a channel, said rib being received in said channel when said support engages the coreless roll first end and supports said coreless roll.

3. The apparatus according to Claim 1 wherein said stabilizing element comprises a recess formed in said support, said coreless roll offset portion comprising a projection extending outwardly from said coreless roll planar portion and received within said recess when said support engages the coreless roll first end and supports said coreless roll.

4. The apparatus according to Claim 1 wherein said coreless roll second end also has a planar portion formed by edges of said first plurality of convolutions and an offset portion defined by edges of said second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions, said stabilizing means including at least one stabilizing element at least partially registrable with the offset portion of said second end and cooperable therewith to resist movement of said coreless roll relative to said dispensing aperture.

5. The apparatus according to Claim 4 wherein said housing includes an upper wall, said stabilizing element at least partially registrable with the offset portion of said second end and cooperable therewith to resist movement of said cordless roll relative to said dispensing aperture being located at said upper wall.

6. The apparatus according to Claim 5 wherein said stabilizing elements are in general alignment, said stabilizing elements being out of registration with said dispensing aperture and located closely adjacent to the outer periphery of said coreless roll.

7. The apparatus according to Claim 6 wherein said stabilizing elements have a generally circular configuration.

8. The apparatus according to Claim 5 wherein said housing includes two separable housing components, one of said housing components including said support and the other of said housing components including said upper wall, said support and said upper wall being separated a distance generally corresponding to the length of said coreless roll when assembled to form said housing.

9. In combination:

a center-pull dispenser housing having a top and a support, said support defining a dispensing aperture spaced from said top;

a coreless roll of sheet material having opposed ends with one end disposed on said support and with the coreless center of said roll in at least partial registration with said dispensing aperture, the lead end of the sheet material of said coreless roll extending from said coreless roll center through said dispensing aperture; and

stabilizing means in operative association with said housing and said coreless roll for maintaining said coreless roll in a predetermined position relative to said dispensing aperture and for resisting collapse of said coreless roll when said coreless roll nears depletion due to dispensing of said sheet material through said dispensing aperture wherein said opposed ends of said coreless roll each including a planar portion formed by edges of a first plurality of convolutions of sheet material and an offset portion defined by edges of a second



plurality of sheet material convolutions and with said stabilizing means comprising stabilizing elements extending from said housing top and support engageable with said offset portions.

10. A coreless roll of sheet material for dispensing from dispenser apparatus including a housing having a top and a support spaced a predetermined distance from said top, said support defining a dispensing aperture, said coreless roll having a first end, a second end, and said sheet material including a lead end projectable from the center of said coreless roll through said dispensing aperture when said coreless roll is positioned on said support with the coreless roll first end in engagement with said support, said coreless roll first and second ends each having a planar portion formed by edges of a first plurality of sheet material convolutions and an offset portion defined by edges of a second plurality of sheet material convolutions offset from the edges of said first plurality of convolutions, said first and second end offset portions being located closely adjacent to the outer periphery of said coreless roll and spaced from the center of said coreless roll, said offset portions being cooperable with stabilizer elements at said top and at said support when said coreless roll is positioned on said support with the coreless roll first end in engagement with said support to maintain said coreless roll in a predetermined position relative to said dispensing aperture and resist collapse of said coreless roll when said coreless roll nears depletion caused by dispensing of said sheet material through said dispensing aperture.

11. The coreless roll of Claim 10 wherein said offset portions are in alignment.

1/1

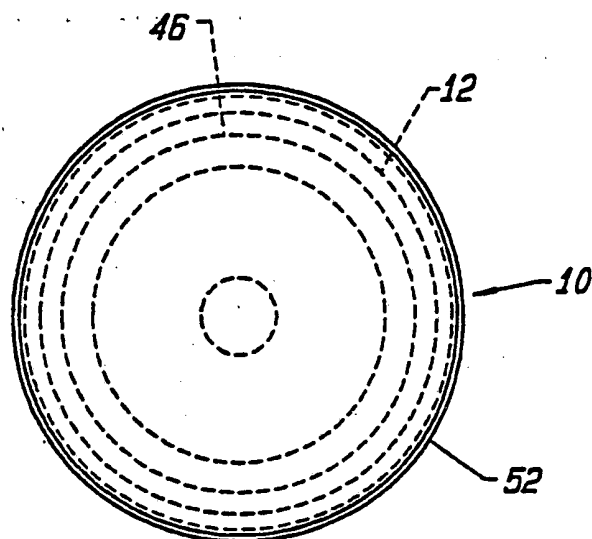


FIG. 2

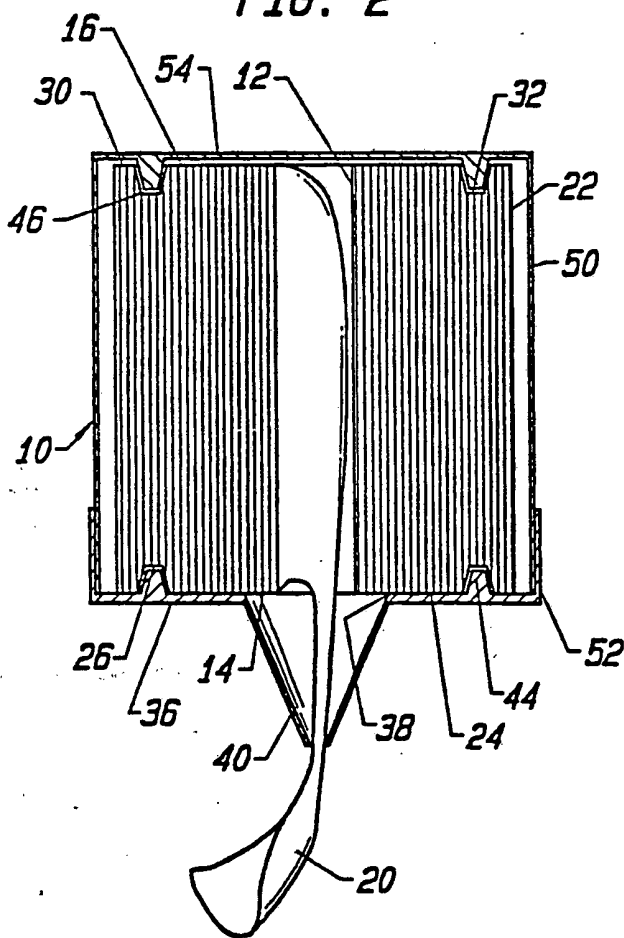


FIG. 1

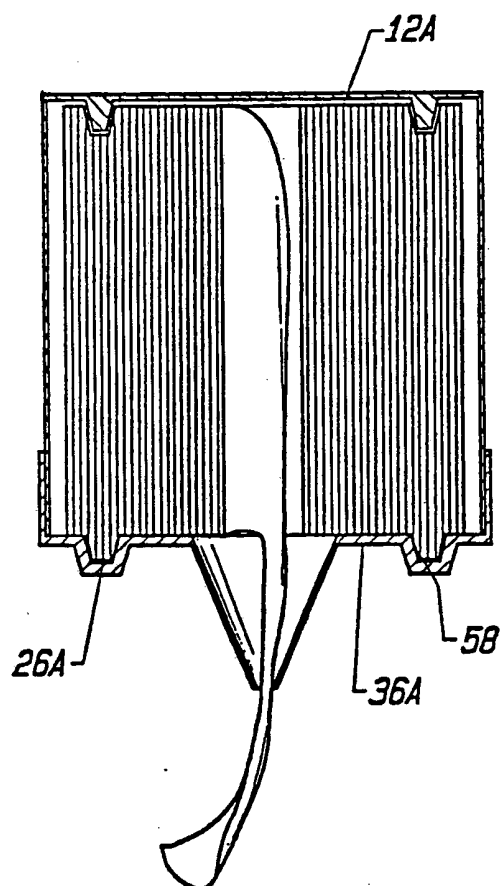


FIG. 3

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 A47K10/38		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>7</sup>		
Classification System	Classification Symbols	
Int.Cl. 5	A47K ; B65H ; B65D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
X	EP,A,0 480 848 (GRANGER) 15 April 1992	1,10
A	see column 3, line 51 - column 4, line 1; figure 2	3,8,9,12
A	US,A,4 431 141 (SCHUTZ) 14 February 1984 cited in the application see figure 1	1-5,7,8, 12,13
A	US,A,4 951 891 (KOZBUR) 28 August 1990 see figure 1	1,2,3,5, 8,12
<p><sup>10</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
30 AUGUST 1993		08 -09- 1993
International Searching Authority		Signature of Authorized Officer
EUROPEAN PATENT OFFICE		HUBAU M.G.

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.**

US 9304744  
SA 75014

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30/08/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0480848	15-04-92	FR-A- 2667853	17-04-92
US-A-4431141	14-02-84	CA-A- 1198271	24-12-85
		EP-A- 0096984	28-12-83
US-A-4951891	28-08-90	CA-A- 2008260	23-07-90
		EP-A- 0380438	01-08-90